MATH 103 - Make-Up Test #2 - 4/13/00

Points in [brackets] total 100. ***Show all work for full credit. Short answer questions should be answered in full sentences*** **The following formulas may be used as needed:**

$$P_{n,r} = \frac{n!}{(n-r)!} \qquad C_{n,r} = \frac{n!}{r!(n-r)!} \qquad E.V. = \sum p_i x_i$$

1. [20] A baseball player's historical batting average is .290.

a. On how many of their next 30 official at-bats do you expect them to get a hit?

b. Suppose they only get 15 hits out of these 30. How many hits would you expect them to get on their following 30 at-bats? **Explain!**

c. What does the "Law of Large Numbers" tell us about this situation?

2. [20] Suppose the odds *against* you winning a game are 5:2.

a. Are you more likely to win or lose? **Explain!**

b. What is the probability you will win?

c. What are the odds *for* you winning?

2. There are 10 people in MATH 103. I will choose four people "at random" (i.e., in a fair drawing) to go on a free trip to Bermuda

[15]

a. How many different groups of four people can be chosen to go on the trip?

b. Suppose the class consists of four men and six women and the four people chosen are all men. One of the women in the class claims I did not conduct a fair drawing but was motivated by gender bias. Do you think she is making a reasonable claim? **Explain your answer!**

2. 50 people enter a marathon. The top five finishers are listed in the next day's newspaper, from 1st through 5h place.

[15]

a. In how many different ways could the order of finish appear in the paper?

b. If the sports editor tries to guess the order of finish (but really has know knowledge of long-distance running) what are the chances they will guess correctly?

5. You are offered the following game. You will roll a *weighted* six-sided die. The following table gives the probability for each face and a value which is written on the face.

Prob.	.3	.2	.2	.1	.1	.1
Value	!5	!3	!1	0	3	20

You roll the die and whatever value is showing is the amount you win.
(A negative amount means you must pay me!)

[15]

c. What is the *expected* amount you will win per roll?

d. Based on (a), if you could play this game many, many times would you want to play? **Your answer should include a discussion about how much cash you have available in your pocket!**

e. If you could play just *once* would you want to play? **Explain!**

3. Licence plates in the State of Confusion must follow one of two patterns. They either have three letters followed by three digits, or three digits followed by three letters. In an attempt to minimize confusion, the letter O cannot be the first letter and the digit 0 cannot be the first digit. How many licence plates can be constructed in the State of Confusion?

[15]